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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/881,500	06/14/2001	Surajit Chaudhuri	15-847 - 4254	7764

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EXAMINER
LEROUX, ETIENNE PIERRE

ART UNIT	PAPER NUMBER
2171	5

DATE MAILED: 09/17/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/881,500	CHAUDHURI ET AL.	
	Examiner	Art Unit	
	Etienne P LeRoux	2171	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____ .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-23* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-23* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *14 June 2001* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) *4* .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

Claim Rejections - 35 USC § 112

1. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

2. Claims 8 and 15 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. Claims 8 and 15 recite "wherein the frequency of the parent bucket is diminished by the frequency of the child bucket." It is unclear how applicant reduces the number of parent buckets relative to the number of child buckets.

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. Claims 8 and 15 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Claims 8 and 15 recite "wherein the frequency of the patent bucket is diminished by the frequency of the child bucket." The scope of the invention is indeterminate since the frequency is not clearly defined. It is difficult to understand how the parent bucket, i.e., often a single bucket can be reduced the number of the child buckets.

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 1 and 3-7 are rejected under 35 U.S.C. 103(a) as being unpatentable over US Pat No 5,920,870 issued to Briscoe et al (hereafter Briscoe '870) in view of US Pat No 6,507,840 issued to Ioannidis et al (hereafter Ioannidis '840).

Claim 1:

Briscoe '870 discloses in a database system, having a plurality of existing buckets arranged in a hierarchical manner [col 2, line 61 through col 3, line 10] and defined by at least two bucket boundaries, a bucket volume and a bucket frequency [col 6, lines 10-18] comprising the step of creating at least one new bucket [col 8, lines 7-13] in response to a query [col 5, lines 24-40 and col 6, lines 18-47] on the database wherein each new bucket is contained within at least one existing bucket and wherein the new bucket becomes a child bucket and the existing bucket becomes a parent bucket [col 7, lines 30-53]

Briscoe '870 discloses the elements of claim 1 as noted above.

Briscoe '870 fails to disclose a histogram.

Ioannidis '840 discloses a histogram [Fig 5]

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Briscoe '870 to include a histogram as taught by Ioannidis '840.

The ordinarily skilled artisan would have been motivated to modify Briscoe '870 as above for the purpose of improving the invention by providing a method for generating an approximate answer in response to a query to a database [col 4, lines 1-5]

Claim 3:

Briscoe '870 wherein the boundaries of each new bucket correspond to a region of the database accessed by the query and the frequency of each new bucket is a number of data records returned by the query [col 7, lines 32-55].

Claim 4:

The combination of Briscoe '870 and Ioannidis '840 disclose the elements of claim 1 as noted above.

The combination of Briscoe '870 and Ioannidis '840 fails to discloses wherein a total number of buckets is limited to a predetermined budget.

Official Notice is taken that wherein a total number of buckets is limited to a predetermined budget is well-known and expected in the art.

The ordinarily skilled artisan would have been motivated to modify the combination of Briscoe '870 and Ioannidis '840 as above for the purpose of allocation resources on an economical basis.

Claim 5:

The combination of Briscoe '870 and Ioannidis '840 discloses the elements of claims 1 and 4 as noted above.

The combination of Briscoe '870 and Ioannidis '840 fails to disclose the step of merging buckets based on a merge criterion when the total number of buckets exceeds the predetermined budget.

Official Notice is taken that the step of merging buckets based on a merge criterion when the total number of buckets exceeds the predetermined budget is well-known and expected in the art.

The ordinarily skilled artisan would have been motivated to modify the combination of Briscoe '870 and Ioannidis '840 as above for the purpose of allocating resources on an economical basis.

Claim 6:

The combination of Briscoe '870 and Ioannidis '840 discloses the elements of claims 1, 4 and 5 as noted above.

The combination of Briscoe '870 and Ioannidis '840 fails to disclose wherein the merge criterion is a similar bucket density, wherein bucket density is based on the bucket frequency divided by the bucket volume.

Official Notice is taken that wherein the merge criterion is a similar bucket density, wherein bucket density is based on the bucket frequency divided by the bucket volume is well-known and expected in the art.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the combination of Briscoe '870 and Ioannidis '840 to include wherein the merge criterion is a similar bucket density, wherein bucket density is based on the bucket frequency divided by the bucket volume

The ordinarily skilled artisan would have been motivated to modify the combination of Briscoe '870 and Ioannidis '840 as noted above for the purpose of determining whether the memory utilization has been done on an economical basis.

Claim 7:

Briscoe '870 discloses shrinking the boundaries of each new bucket if the boundaries of the new bucket intersect any existing bucket boundaries [col 11, lines 14-33].

3. Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of Briscoe '870 and Ioannidis '840 and further in view of US Pat No 6,353,832 issued to Acharya et al (hereafter Acharya '832).

Claim 2:

The combination of Briscoe '870 and Ioannidis '840 discloses the elements of claim 1 as noted above.

The combination of Briscoe '870 and Ioannidis '840 fails to disclose a rectangular bucket.

Acharya '832 discloses a rectangular bucket.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the combination of Briscoe '870 and Ioannidis '840 to include a rectangular bucket as taught by Acharya '832.

The ordinarily skilled artisan would have been motivated to modify the combination of Briscoe '870 and Ioannidis '840 for the purpose of improving the invention by providing

accurate estimate estimates for point and range queries over two-dimensional spatial data [col 1, lines 50-55]

4. Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of Briscoe '870 and Ioannidis '840 and further in view of US Pat No 5,991,764 issued to Sundaresan (hereafter Sundaresan '764), as best examiner is able to ascertain.

Claim 8:

The combination of Briscoe '870 and Ioannidis '840 discloses the elements of claim 1 as noted above.

The combination of Briscoe '870 and Ioannidis '840 fails to disclose wherein the frequency of the parent bucket is diminished by the frequency of the child bucket.

Sundaresan '764 discloses wherein the frequency of the parent bucket is diminished by the frequency of the child bucket [Fig 6]

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the combination of Briscoe '870 and Ioannidis '840 to include wherein the frequency of the parent bucket is diminished by the frequency of the child bucket as taught by Sundaresan '764.

The ordinarily skilled artisan would have been motivated to modify the combination of Briscoe '870 and Ioannidis '840 as above for the purpose of dividing a task so that it may be distributed among processors operating in parallel [col 1, lines 50-55]

Claims 9, 11-14, 16, and 18-23 are rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of Briscoe '870 and Ioannidis '840 and further in view of Pub No US 2001/0010091 issued to Noy (hereafter Noy '091).

Claims 9, 16, 20 and 22:

The combination of Briscoe '870 and Ioannidis '840 discloses the essential elements of claim 9 as noted above.

The combination of Briscoe '870 and Ioannidis '840 fails to disclose creating at least one candidate hole in the histogram based on the results of the query.

Noy '091 discloses creating at least one candidate hole in the histogram based on the results of the query [paragraph 21]

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the combination of Briscoe '870 and Ioannidis '840 to include creating at least one candidate hole in the histogram based on the results of the query as taught by Noy '091.

The ordinarily skilled artisan would have been motivated to modify the combination of Briscoe '870 and Ioannidis '840 as above for the purpose of improving the invention by determining that certain sets of constraints will prevent certain values or ranges of values from being reached by the test and modifying the input process to test those areas.

Claims 11, 18, 21 and 23:

The combination of Briscoe '870, Ioannidis '840 discloses the essential elements of claim 9 as noted above.

The combination of Briscoe '870 and Ioannidis '840 fails to disclose wherein the boundaries of each candidate hole correspond to a region of the database accessed by the query and the frequency of each candidate hole is a number of data records returned by the query.

Noy '091 discloses wherein the boundaries of each candidate hole correspond to a region of the database accessed by the query and the frequency of each candidate hole is a number of data records returned by the query [paragraph 21].

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the combination of Briscoe '870 and Ioannidis '840 to include wherein the boundaries of each candidate hole correspond to a region of the database accessed by the query and the frequency of each candidate hole is a number of data records returned by the query as taught by Noy '091.

The ordinarily skilled artisan would have been motivated to modify the combination of Briscoe '870 and Ioannidis '840 as above for the purpose of improving the invention by determining that certain sets of constraints will prevent certain values of ranges from being reached by the test and modifying the input process to test those areas.

Claim 12:

The combination of Briscoe '870, Ioannidis '840 and Noy '091 discloses the elements of claim 9 as noted above.

The combination of Briscoe '870, Ioannidis '840 and Noy '091 fails to disclose wherein a total number of buckets is limited to a predetermined budget.

Official Notice is taken that wherein a total number of buckets is limited to a predetermined budget is well-known and expected in the art.

The ordinarily skilled artisan would have been motivated to modify the combination of Briscoe '870, Ioannidis '840 and Noy '091 as above for the purpose of allocation resources on an economical basis.

Claims 13 and 19:

The combination of Briscoe '870, Ioannidis '840 and Noy '091 discloses the elements of claims 1 and 4 as noted above.

The combination of Briscoe '870, Ioannidis '840 and Noy '091 fails to disclose the step of merging buckets based on a merge criterion when the total number of buckets exceeds the predetermined budget.

Official Notice is taken that the step of merging buckets based on a merge criterion when the total number of buckets exceeds the predetermined budget is well-known and expected in the art.

The ordinarily skilled artisan would have been motivated to modify the combination of Briscoe '870, Ioannidis '840 and Noy '091 as above for the purpose of allocating resources on an economical basis.

Claim 14:

The combination of Briscoe '870 and Ioannidis '840 and Noy '091 discloses the elements of claims 11 and 13 as noted above.

The combination of Briscoe '870, Ioannidis '840 and Noy '091 fails to disclose wherein the merge criterion is a similar bucket density, wherein bucket density is based on the bucket frequency divided by the bucket volume.

Official Notice is taken that wherein the merge criterion is a similar bucket density, wherein bucket density is based on the bucket frequency divided by the bucket volume is well-known and expected in the art.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the combination of Briscoe '870, Ioannidis '840 and Noy '091 is based on the bucket frequency divided by the bucket volume

The ordinarily skilled artisan would have been motivated to modify the combination of Briscoe '870, Ioannidis '840 and Noy '091 as above for the purpose of determining whether the memory utilization has been done on an economical basis.

5. Claims 10 and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of Briscoe '870, Ioannidis '840 and Noy '091 and further in view of Acharya '832.

Claims 10 and 17:

The combination of Briscoe '870, Ioannidis '840 and Noy '091 disclose the elements of claim 9 as noted above.

The combination of Briscoe '870, Ioannidis '840 and Noy '091 fails to disclose a rectangular bucket.

Acharya '832 discloses a rectangular bucket.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the combination of Briscoe '870, Ioannidis '840 and Noy '091 to include a rectangular bucket as taught by Acharya '832.

The ordinarily skilled artisan would have been motivated to modify the combination of Briscoe '870, Ioannidis '840 and Noy '091 as above for the purpose of improving the invention by providing accurate estimate estimates for point and range queries over two-dimensional spatial data [col 1, lines 50-55]

6. Claim 15 is rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of Briscoe '870, Ioannidis '840 and Noy '091 and further in view of Sundaresan '764.

Claim 15:

The combination of Briscoe '870, Ioannidis '840 and Noy '091 discloses the elements of claim 9 as noted above.

The combination of Briscoe '870, Ioannidis '840 and Noy '091 fails to disclose wherein the frequency of the parent bucket is diminished by the frequency of the child bucket.

Sundaresan '764 discloses wherein the frequency of the parent bucket is diminished by the frequency of the child bucket [Fig 6]

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the combination of Briscoe '870, Ioannidis '840 and Noy '091 to include wherein the frequency of the parent bucket is diminished by the frequency of the child bucket as taught by Sundaresan '764.

The ordinarily skilled artisan would have been motivated to modify the combination of Briscoe '870, Ioannidis '840 and Noy '091 as above for the purpose of dividing a task so that it may be distributed among processors operating in parallel [col 1, lines 50-55]

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Etienne LeRoux whose telephone number is (703) 305-0620. The examiner can normally be reached on Monday – Friday from 8:00 AM to 4:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Safet Metjahic, can be reached on (703) 308-1436.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 305-3900.

Etienne LeRoux

September 10, 2003

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